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Verbalism in the Narrative Language of Children Who Are Blind and Sighted

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Abstract: This study examined the use of verbalisms by 62 children aged 7–14 who were totally blind from birth and 64 sighted children. It found that a child's degree of sight and gender did not affect the frequency with which verbalisms were used; only age had a significant positive effect. The study shows that language is a flexible structure that is used correctly by children who are congenitally blind as they adapt to the language used by those around them.

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In everyday language, there are words, such as *beauty*, that are difficult for the average person to define. People who are blind often use words that have a visual meaning (such as "I have seen," "Show me," or "The countryside is looking really green") that they may have difficulty defining, and it is interesting to observe the usage and meaning that such words of a visual nature can have for them. In this article, we present our study of this aspect of language behavior in children who were born blind,

which is known as *verbalism*—the tendency to use words whose concrete referent is unknown to the speaker. In doing so, we reviewed the empirical research on this aspect of the language and behavior of people who are blind, but did not make use of the theoretical reviews that deal with this problem because these reviews were based mainly on research on verbalism (Dokecki, 1966; Dunlea, 1989; Landau, 1997; Landau & Gleitman, 1985; Mulford, 1988; Pérez-Pereira & Castro, 1997; Pérez-Pereira & Conti-Ramsden, 1999; Warren, 1994).

Review of research

Little research has been conducted on the verbalisms used by people who are blind, in spite of its importance from the linguistic, psychological, and educational points of view (Cutsforth, 1951; Gleitman, 1990; Henri, 1948; von Tetzchner & Martinsen, 1980). Cutsforth (1932, 1951) was the first author to refer to the concept of verbalism as an aspect of the psychology of people who are blind. He defined verbalism as "the use of abstract concepts not apprehended by concrete experiences" (Cutsforth, 1951, p. 48). Thus, individuals who are visually impaired (that is, those who are blind or have low vision) demonstrate verbalism when they use terms that refer to vision (such as names of colors or words related to the sense of sight).

To examine verbalism, Cutsforth (1932, 1951) used a word-association test with 26 children aged 8–21 who had been totally blind from birth. The results showed that "nearly half" the responses included words that expressed visual qualities. Cutsforth interpreted these findings as showing that the sensory experience (touch, hearing, taste, and smell) of a person who is blind was replaced by that of the sighted; that is, the language and cognition of persons who are blind were a compensatory copy of those of persons who are sighted. From this interpretation, he inferred psychopathological and social consequences for people

with little or no vision.

Henri (1948) administered a word-definition test and a gestural test to a group of children who had been blind from birth. First, the children were asked for the definition of words with concrete referents, and when a child gave the correct definition, he or she was then asked to describe the object by means of gestures. Henri found that the vocabulary that the children used was limited and that the children were not able to express shapes (in descriptions of objects like *roof* and *stirrup)* or how things worked using their hands. The children were also given a word-association test with the list used by Cutsforth (1932, 1951), and similar results were obtained.

Nolan (1960) conducted an experiment that was almost a replication of Cutsforth's work, but in this case using two experimental groups made up of boys and girls aged 9–20 who were "totally blind or had light perception only." One group (the controlled-association group) gave a single answer to a cue word, while the other group (the free-association group) could answer with all the words that the cue word evoked in them. The controlled-association group was made up of 8 boys and 8 girls who were blind or nearly blind (they could perceive only direct light at most), and the free-association group included 18 boys and 21 girls who shared the same characteristics as those in the other group.

Nolan (1960) found that the percentage of verbalisms was lower in the free-association task than in the controlled situation, but the difference between the two percentages was not significant. There were differences, however, between the percentages in either of his two tasks and those obtained by Cutsforth (1932, 1951). In any case, Cutsforth's group showed a statistically higher degree of verbalism.

Harley (1963) conducted research to determine the relationship between verbalism and the age, intelligence, experience, and psychosocial adjustment of children with visual impairments. To do so, a group of children were given three tests: (1) word definition, (2) identification through tactile exploration of objects that had been well defined beforehand, and (3) a personal adjustment test. The experiment was quantified by means of the word-definition test, in which the children were asked whether they had contact with the object that the word referred to. The incidence of "verbalism for objects" was the number of objects the child identified poorly (but defined correctly), and the score for "visually oriented verbalism" was the number of verbalisms about visual perception or about colors that a child used in the word-definition test. As the sample of participants for his research, Harley randomly selected 40 children (15 boys and 25 girls) who had been blind from birth. The children's ages ranged from 6 to 14, and their IQs were between 65 and 132.

Harley found that only verbalism for objects correlated in a significantly negative way with chronological age, with IQ, and with the level of personal adjustment. No significant correlation was found between visually oriented verbalism and the age, intelligence, experience, or psychosocial adjustment of the children who were blind. (Harley did not attempt to determine whether there was any correlation between the two types of verbalism.)

In an experiment that was almost a replication of Harley's (1963), Demott (1972) administered the same word-definition and object-identification tests as Harley, but also gave the participants a semantic differential test. The sample consisted of three groups of participants: 41 who were totally blind, 41 who were visually impaired (people who were legally blind), and 61 paired participants who were sighted (each participant who was blind had a "partner" in the groups of children who were visually

impaired and sighted, all of whom were selected according to academic level, age, gender, and IQ). All the children were aged 6–19. The results showed that there were no statistically significant differences between the language used by the members of the three groups. Furthermore, no differences were found between the three groups with respect to object recognition.

Von Tetzchner and Martinsen (1980) conducted a study that was also a near-replication of Harley's (1963), but used a group of 8 children aged 8–13 who were blind and a control group of 8 sighted children who were paired with the group of blind children according to age and gender. The sighted children performed an object-recognition task while blindfolded. The only statistically significant result was a significant negative correlation between the level of language (number of correctly defined words) and verbalism. No quantitative studies were conducted to compare the performance of participants who were blind and those who were sighted, but both groups used verbalisms.

McGinnis (1981) tested the oral and gestural communication of six children who were blind aged 3 1⁄2 to 5, who were matched with six children who were sighted according to age, language, and IQ. This author tested the children individually and held a one-hour conversation with each of them, which was audiotaped, while an observer noted the gestures made by the children. Terms of a visual nature were classified as being of three types: (1) color words; (2) verbs with a visual reference ("see," "look," "stare," "watch," and so forth); and (3) verbs with a visual reference but that are used in idioms and mean things like "understand," "imagine," and so on. The findings showed that there were statistically significant differences in the sighted children's use of verbalisms in Categories 1 and 2, but not in Category 3. McGinnis pointed out that the children who were blind used fewer visual terms than did those who were sighted because these words apparently had little value for them, even though in

idiomatic expressions, terms involving vision are "nonsensorial concepts."

Monti's (1983) study involved a sample of 10 children aged 13–16 who had been blind from birth or shortly afterward and 10 sighted children of similar ages and genders to those who were blind; all the participants had typical IQs and no other impairments. Each child was asked to define 28 words referring to four different semantic fields: objects, animals, movements (verbs), and facial expressions. No statistically significant differences were observed between the two groups in any of the semantic fields, although in defining verbs of movement, there was a nonsignificant tendency for the children who were blind to give better responses than those who were sighted. Monti noted that no differences were observed between the two groups of children with respect to their capacity to define terms and, therefore, their capacity for knowledge and language. On the basis of these findings, Monti concluded that verbalism affected only particular areas of language or certain semantic fields.

Landau and Gleitman (1985) conducted a longitudinal follow-up study in which they examined the case of Kelli, a young girl who was totally blind from birth, and a control group consisting of four sighted children who were of the same age. They found that Kelli used the verbs *look* and *see* correctly in a normal conversation, and they described the linguistic contexts in which she used each term. Landau and Gleitman also conducted interviews (or "clinical experiments" in the sense that Piaget used the term) with Kelli at age 36 months and found that Kelli interpreted *look* as meaning "contact with the hands," whereas in a similar situation (but blindfolded), the sighted children of the same age understood *look* to mean "turn one's nose toward." Kelli understood that the action of "seeing" referred to the perception of objects that are situated at a distance from the speaker, with nothing between the speaker and the object, or she showed the

object correctly when asked to "let Mommy see the toy" and hid it in a suitable way (for example, in her pocket) when she was requested to "make it so Mommy cannot see the car."

With respect to color terms, Landau and Gleitman pointed out that Kelli used up to 10 color terms correctly in her language and that her knowledge of how to use them properly was gained from the syntactic frames in which such terms appeared. She understood that all the terms belonged to a superordinate domain that is color, that they are used as adjectives (properties) describing concrete objects, but that it is not possible to apply these terms to other properties (such as size or shape), and all this was possible despite Kelli's understanding that she did not know what they meant. Landau and Gleitman concluded that the learning of language (and of terms that refer to sight or to colors) is achieved through the contexts (people, objects, and language) in which speech occurs, as well as from the information provided by the syntactic structures that contain the words that are spoken.

In this brief review of research, it can be seen that five studies (Demott, 1972; Landau & Gleitman, 1985; McGinnis, 1981; Monti, 1983; von Tetzchner & Martinsen, 1980) included control groups of sighted children. The method that was most frequently used to collect data involved word association (Cutsforth, 1932, 1951; Henri, 1948; Nolan, 1960). Demott (1972), Harley (1963), and Monti (1983) used word-definition and identification tests, and only McGinnis (1981) and Landau and Gleitman (1985) made use of natural expressive language tests with children. One fundamental problem is the actual definition of blindness, and few studies have taken this definition into account (samples of children who were totally blind from birth were tested by Cutsforth, 1932, 1951; Demott, 1972; Henri, 1948; Landau & Gleitman, 1985; McGinnis, 1981; and Monti, 1983).

In the present study, the participants were children who had been

totally blind from birth. By including only children who were congenitally totally blind, we hoped to avoid the problems of psychological and visual variations in the legal definition of blindness (totally blind, light perception only, and low vision) and thus to have a more uniform sample. By studying only children who were totally blind from birth we were able to avoid the problem of individual differences with respect to experiences with perception, knowledge, and the denomination of colors and with respect to the terms *see* and *look.* A serious drawback in several of the previous studies may have been that the continual interaction between the researcher and the child may have led to an implicit effect caused by the researcher (Bonge, Schuldt, & Harper, 1992; Rosenthal, 1967; Sheldrake, 2001), which could produce a bias toward the researcher's expectations in the results.

In the previous studies, age was not taken as an independent variable (data on age were provided in Harley's, 1963, study), and neither was gender (girls perhaps tend to use more expressive or colorful language). In the present study, we used a systematic sampling method that was based on the child's age, gender, and vision status and asked each child to tell a story and then to describe one of the characters. The aim of this research was to examine whether children's age, gender, and vision status (blind or sighted) had any significant effects on the covariance structure of their verbalisms.

Method

A sample of 126 children was used. The blind children studied at schools of the Organización Nacional de Ciegos (National Organization of the Blind) in Madrid and Alicante, Spain; the sighted children studied at the Pizarrales and Fonseca schools, in Salamanca, Spain. To homogenize the sample of blind children, only those who had been totally blind from birth and did not show any other symptoms of physical, sensory, or cognitive impairment

were selected. One subsample was made up of 62 boys and girls who were blind, while the other included 64 sighted boys and girls, all aged 7–14. None of the children had any educational impairments or physical or growth problems. Table 1 shows the age groups. The aim of the sampling was to take 4 participants for each stratum (according to vision status, gender, and age). However, in the groups of 7- and 11-year-old children who were blind, we were able to select only three children because in the two schools for children who are blind with which we worked, there were no more children who met the requirements for participation in the study. A high percentage of children who are congenitally blind have other associated physical and cognitive impairments.

Each child was interviewed individually and was asked to tell two stories and then to describe a character from one of the stories; all these descriptions were audiotaped. Briefly, the first story each child was asked to tell had to be based on the words *family*, *parents*, and *friendship*. The second story was to be invented according to the feelings evoked by the words *couple*, *hug*, and *tomorrow*. For the description of the character, each child was asked to choose whichever character he or she wanted from the first two stories and to describe the character as thoroughly as possible (what the character looked like, how the character thought, the way the character behaved, the ideals the character had, and so on).

In an attempt to prevent the children from receiving possible communication clues that could give rise to the researchers' biases, after the instructions had been read to each child, the child was allowed to tell the corresponding narration (the two stories and the description) without interruption. The first story was considered a trial run for the children, and only the terms used in the second story were quantified.

The following observable variables were used for each participant: gender (V1); vision (V2); age (V3); total verbalism in the story (V4), which was the total number of color-related words or expressions referring to sight that a child used in the second story; relative verbalism in the story (V5), which was the total number of verbalisms in the story divided by the total number of words uttered by the child in the story, multiplied by 10,000 to avoid decimals; total verbalism in the description (V6), which was the total number of words referring to colors or to sight-related expressions used by the child in the description of the character; and relative verbalism in the description (V7), which was the total verbalism in the description of the character divided by the total number of words uttered by the child in the description multiplied by 10,000. The relative verbalism variables were used because the length of the stories that the children told varied greatly.

The specific hypotheses of this study, which can be seen graphically in Figure 1, were as follows:

1. the effects among the variables:
    1. There is a latent variable, verbalism in the story (F1), which gives rise to the total verbalism in the story (V4) and the relative verbalism in the story (V5).
    2. There is a latent variable, verbalism in the description (F2), which gives rise to the total verbalism for the description (V6) and the relative verbalism for the description (V7).
    3. The latent variables F1 and F2 are influenced by the variables gender (V1), vision (V2), and age (V3).

2. The two groups (the participants who are blind and those who are sighted) will be compared with a multisample system to determine whether they have the same covariance structure as that found in Hypothesis 1 for the general model of the use of verbalisms (Dunn, Everitt, & Pickles, 1993; Rencher, 1995; Satorra, 2001).

Since the hypotheses make up an effect structure that includes independent, intermediate, and dependent variables, we analyzed the data by means of a structural equation model that responds to the hypotheses put forward. This model describes a system of the use of verbalisms, in terms of gender, sight, and age, that is influenced by two factors, depending on the task being performed by the child: telling a story and describing a character.

Structural equation models consist of simultaneous equations containing observed and latent variables, and these models therefore constitute a system of prediction that includes multiple regression and factorial analysis. In the terminology used in structural equation analysis, a latent variable is a factor that is hypothesized from the observed variables and can be affected by other variables or other factors. In psychology or education, however, a latent variable is an implicit property that influences the values of the corresponding observable variables. As can be seen, the independent variables that were used in this model were gender, vision, and age (V1, V2, and V3), while the dependent variables were the variables measuring verbalism (V4, V5, V6, and V7). The latent variables F1 and F2 were the intermediate variables of the system. Note that no hypothesis on the covariance between independent variables (gender, vision, and age) was formulated.

In the graphic representation of the structural equation model, we followed Bentler's (2004) system of notation, which uses rectangles to represent the variables observed (V1, V2, V3, and

V4); the latent variables (F1 and F2) are shown using ovals; the effects of some variables on others are represented by arrows (which show the direction of each respective effect); the arrows that are labeled with the letter "E" (E1, E2, E3, and E4) are the standard errors of the variables observed; and the arrows marked with the letter "D" (D1 and D2) are the corresponding standard errors of the latent variables.

Results

The data were analyzed using the EQS software for structural equation models (Bentler, 2004). Before we began the analyses, we performed an exploratory test for the normality of the observed variables about verbalism (V4, V5, V6, and V7) using the Kolmogorov-Smirnov test with the Lilliefors correction, and they were found not to fit normality (SPSS, 1999; Stevens, 1992; Tabachnick & Fidell, 2001). Because of the nonnormality of the variables, we estimated the parameters using Satorra and Bentler's (1994) "robust" system, which weights each case according to its deviation with respect to the multinomial distribution of the sample.

The results of the overall fit statistics for the model corresponding to Hypothesis 1 are shown in Figure 2, where the value of the Satorra-Bentler robust χ^2 (11, N = 126) = 11.019, p = .442, RMSEA = .004, with CI for RMSEA = .000-.094, BBNFI = .951, BBNNFI = 1.000, CFI = 1.000, which shows that the data fit the model proposed in a statistically significant manner. The independent variables of gender and sight, however, are not significant.

To estimate a more parsimonious model (with significant joint statistics and with significant *t*-values for each coefficient), we performed an analysis with the variable age as the only independent variable of the latent variables verbalism in the story

(F1) and verbalism in the description (F2) (Maruyama, 1998; Ullman, 2001). This analysis yielded the following overall fit statistics for the model: Satorra-Bentler χ^2 (15, N = 126) = 15.468, p = .418, RMSEA = .016, with CI for RMSEA = .000-.086, BBNFI = .931, BBNNFI = .997, CFI = .998. The results of the coefficients of the model can be seen in Figure 3.

The difference between the χ^2 values of the two models is 4.449, and the difference in the degrees of freedom is 4. There are, therefore, no significant differences between the two models (p = .349). The advantage of the model in Figure 3 (besides its parsimony) is that it is easier to perceive only the statistically significant relationships between the variables.

The joint results of the models in Figures 2 and 3 change (different χ^2 values are obtained with different degrees of freedom), but the probability of the fit and the coefficients of the effects do so only slightly, which shows that the model is stable (Kaplan, 2000; Kline, 1998; Mueller, 1998; Raykov & Penev, 2001; Williams, Bozdogan, & Aiman-Smith, 1996).

To test Hypothesis 2, concerning the equality of the covariances, we conducted a multisample analysis of covariance structure to examine the equality of the two groups (blind and sighted) with respect to the coefficients we obtained (see Figure 3). The overall fit statistics for the model were Satorra-Bentler χ^2 (2 groups, 12, N 1 = 62, N 2 = 64) = 13.861, p = .309, RMSEA = .035, with CI for RMSEA = .000-.101, BBNFI = .934, BBNNFI = .984, CFI = .990. These results show that the two groups are not significantly different in their covariance structure from the model we obtained (Yuan & Bentler, 2001).

Discussion

The most important conclusion to be drawn from the analyses is

that a child's degree of sight has no significant effect on the frequency with which the child uses verbalisms and that the covariance structure of the language used by children who are blind and those who are sighted is similar. With regard to verbalism, we found no statistically significant differences in the language of the two groups of children (blind and sighted), and gender also had no effect on it. Age, however, did have a significant positive effect on the verbalism of the children (regardless of their gender or their state of vision), which points to a significant tendency to use more visual terms as the child's age increases.

The findings (the significant positive relationship between age and verbalism) may seem to contradict those of Harley (1963), who found no correlation between age and visually oriented verbalism, but the task was different in the two cases; Harley used word definition, whereas we used spontaneous narrative. As Harley pointed out, the absence of a relationship between the aforementioned variables is probably due to two reasons: first, his method was perhaps not sensitive enough to measure this variable and, second, Harley (and the other authors) may have used samples that were not stratified by age and therefore displayed heterogeneous variance in this variable.

McGinnis (1981) also found that children who are blind used a statistically significant higher number of verbalisms, whereas we found no such differences. It must be borne in mind that McGinnis's research was carried out by means of an informal conversation game with children who were younger than those in the sample that we examined. The unconscious induction effect exerted by the experimenter toward a particular type of response (Rosenthal, 1967) may occur more readily in 4- or 5-year-olds than in older children. These differences in the findings may indicate that up to age 5, verbalisms are used differently according to whether a child is blind or sighted, and that from 6

years onward, these variations (depending on the child's vision) disappear and become age dependent, both in individuals who are blind and those who are sighted. Further studies with stratified samples that cover a wide range of ages are needed to verify these differences.

Cutsforth (1951) concluded that the behavior of individuals who are blind contains psychopathological traits, since these individuals tend to use words that are not founded in their own experience, instead of basing their language on their own sensory experience. From this conclusion, Cutsforth developed a series of implications of a pedagogical and social nature, which, he thought, should be taken into account so that persons with visual impairments can be better integrated into society.

The fact that all children, regardless of their visual status, tend to use verbalisms in a similar way can be interpreted as a positive sign of the capacity of children who are blind to adapt to the general linguistic behavior of the community they live in. Thus, children who are visually impaired use the same kind of language as do sighted children and share the same morphosyntactic particularities as they grow up, although they may use repetitive strategies to hold their sighted interlocutors' attention (Kemter, 1999; Landau, 1997; Mills, 1983; Pérez-Pereira & Castro, 1997; Zeppuhar & Walls, 1998).

From a psycholinguistic point of view, we understand language to be a communicative structure that is made up of words that do not all have a literal meaning. Language is, then, an organized combination of words with meanings that can differ from one individual to another. However, it is language that allows people to share information and experiences using specific personal nuances of meaning, which are, at the same time, universal within the language of the speakers. Thus, individuals who are blind do not have their own particular language that is shaped by their own

experience; rather, their language does not differ (in form and in the vocabulary they use) from that used by sighted children. It must be noted that all the studies on the use of verbalisms have pointed out that people who are visually impaired use verbalisms (referring to sight and colors) correctly from a syntactic and a semantic point of view; thus, visually impaired people have always used these terms as complements to nouns (referring to the color of skin, hair, eyes, clothes, and so on) and in a univocal manner (there are no contradictions in their definitions). The "syntactic bootstrapping" hypothesis of language development has been put forward to highlight the fact that syntax is predominant in the process that children who are blind go through to learn the proper usage and meaning of words (Landau, 1997; Landau & Gleitman, 1985).

If one asks a person who is blind to define words like *see*, *look*, *watch*, and so on, one sees that the meaning is more experiential (more attention is given to perception using the other senses) and more cognitive than strictly visual. In our study, all the visually oriented words were used properly. This problem of the literal meaning of words is not limited to persons who are blind, since in everyday language, there are terms (such as *happiness*) that all people would have difficulty defining if they were asked to do so. Another issue is that of words that refer to colors. Research needs to be conducted to determine whether individuals who are blind tend to use or associate colors with specific objects, such as *coal-black* or *grass-green* (nouns used as a stimulus by Cutsforth, 1932, 1951); with moods; or with the gender of the person they are speaking about.

Several authors have interpreted the verbalism in the language used by people who are visually impaired as a psychopathological tendency. The safest answer, and at the same time the most realistic, if all the results are borne in mind, would be to accept that verbalisms in the language used by children who are visually

impaired is normal. To be able to state that verbalism represents a cognitive or personality flaw would require research on the construction of the language and the reality of the child with a visual impairment during the first years of his or her life and to examine whether people who are visually impaired and have a stronger tendency toward verbalism also display psychopathological traits. We do not know of any studies of this kind that have been conducted. It would be necessary to carry out interdisciplinary research (with linguists, psychologists, and psychopathologists) to study the mechanisms at work in the language behavior of visually impaired and sighted children (Kemter, 1999; Thinus-Blanc & Gaunet, 1997; Tuldava, 1998; Zeppuhar & Walls, 1998).

References

Bentler, P. M. (2004). *EQS structural equations program manual.* Encino, CA: Multivariate Software.

Bonge, D. R., Schuldt, W. J., & Harper, Y. Y. (1992). The experimenter as fixed effect fallacy. *Journal of Psychology, 126,* 477–486.

Cutsforth, T. D. (1932). The unreality of words to the blind. *Teachers Forum, 4,* 86–89.

Cutsforth, T. D. (1951). *The blind in school and society.* New York: American Foundation for the Blind.

Demott, R. M. (1972). Verbalism and affective meaning for blind, severely visually impaired and normally sighted children. *New Outlook for the Blind, 66,* 1–8.

Dokecki, P. R. (1966). Verbalism and the blind: A critical review of the concept and the literature. *Exceptional Children,*

32, 525–532.

Dunlea, A. (1989). *Vision and the emergence of meaning: Blind and sighted children's early language.* New York: Cambridge University Press.

Dunn, G., Everitt, B., & Pickles, A. (1993) *Modelling covariances and latent variables using EQS*. London: Chapman & Hall.

Gleitman, L. (1990). The structural sources of verb meanings. *Language Acquisition, 1*(1), 3–55.

Harley, R. K. (1963). *Verbalism among blind children.* New York: American Foundation for the Blind.

Henri, P. (1948). Cécité et verbalisme [Blindness and verbalism]. *Journal de Psychologie Normale et Pathologique, 41*, 216–240.

Kaplan, D. (2000). *Structural equation modeling: Foundations and extensions.* Thousand Oaks, CA: Sage.

Kemter, P. (1999). Concept formation and spatial perception in blind persons. *Rehabilitation, 38*(1), 27–32.

Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford Press.

Landau, B. (1997). Language and experience in blind children: Retrospective and prospective. In V. Lewis & G. M. Collis (Eds.), *Blindness and psychological development in young children*. Leicester, England: British Psychological Society.

Landau, B., & Gleitman, L. R. (1985). *Language and experience: Evidence from the blind child.* Cambridge, MA:

Harvard University Press.

Maruyama, G. M. (1998). *Basics of structural equation modeling.* Thousand Oaks, CA: Sage.

McGinnis, A. R. (1981). Functional linguistic strategies of blind children. *Journal of Visual Impairment & Blindness, 5*, 210–214.

Mills, A. E. (Ed.). (1983). *Language acquisition in the blind child: Normal and deficient*. London: Croom Helm.

Monti, E. (1983). Verbalism in young blind children. *Journal of Visual Impairment & Blindness, 77*(2), 61–63.

Mueller, R. O. (1998). *Basic principles of structural equation modeling*. New York: Springer.

Mulford, R. (1988). First words of the blind child. In M. D. Smith & J. L. Locke (Eds.), *The emergent lexicon: The child's development of a linguistic vocabulary.* San Diego, CA: Academic Press.

Nolan, C. Y. (1960). On the unreality of words on the blind. *New Outlook for the Blind, 54,* 100–102.

Pérez-Pereira, M., & Castro, J. (1997). Language acquisition and the compensation of visual deficit: New comparative data on a controversial topic. *British Journal of Developmental Psychology, 15,* 439–459.

Pérez-Pereira, M., & Conti-Ramsden, G. (1999). *Language development and social interaction in blind children*. Hove, England: Psychology Press.

Raykov, T., & Penev, S. (2001). The problem of equivalent

structural equation models: An individual residual perspective. In G. A. Marcoulides & R. E. Schumacker (Eds.), *New developments and techniques in structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum.

Rencher, A. C. (1995). *Methods of multivariate analysis*. New York: John Wiley & Sons.

Rosenthal, R. (1967). Covert communication in the psychological experiment. *Psychological Bulletin, 67*, 356–367.

Satorra, A. (2001). Goodness of fit testing of structural equation models with multiple group data and nonnormality. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), *Structural equation modeling: Present and future.* Lincolnwood, IL: Scientific Software.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. Von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399–419). Thousand Oaks, CA: Sage.

Sheldrake, R. (2001). Experiments on the sense of being stared at: The elimination of possible artefacts. *Journal of the Society for Psychical Research, 65*, 122–137.

SPSS. (1999). *SPSS base 10.0 syntax reference guide*. Chicago: Author.

Stevens, J. (1992). *Applied multivariate statistics for the social sciences.* Hillsdale, NJ: Lawrence Erlbaum.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. New York: Allyn & Bacon.

Thinus-Blanc, C., & Gaunet, F. (1997). Representation of space in blind persons: Vision as a spatial sense? *Psychological Bulletin, 121*(1), 20–41.

Tuldava, J. (1998). Investigating causal relations in language with the help of path analysis. *Journal of Quantitative Linguistics, 5*, 256–261.

Ullman, J. B. (2001). Structural equation modeling. In B. G. Tabachnick & L. S. Fidell (Eds.), *Using multivariate statistics* (pp. 653–771). New York: Allyn & Bacon.

von Tetzchner, S., & Martinsen, H. (1980). A psycholinguistic study of the language of the blind: I. Verbalism. *International Journal of Psycholinguistics, 7*, 49–61.

Warren, D. H. (1994). *Blindness and children: An individual differences approach.* New York: Cambridge University Press.

Williams, L. J., Bozdogan, H., & Aiman-Smith, L. (1996). Inference problems with equivalent models. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling*. Hillsdale, NJ: Lawrence Erlbaum.

Yuan, K. H., & Bentler, P. M. (2001). A unified approach to multigroup structural equation modeling with nonstandard samples. In G. A. Marcoulides & R. E. Schumacker (Eds.), *New developments and techniques in structural equation modeling* (pp. 35–56). Mahwah, NJ: Lawrence Erlbaum.

Zeppuhar, M. E., & Walls, R. T. (1998). Knowledge of concept prototypes of students who are blind or have low vision. *Journal of Visual Impairment & Blindness, 92*, 812–822.

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